

Ecosystem Management

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ECOSYSTEM MANAGEMENT

Maine's near shore resources – the coastal lands and neighboring waters that stretch from Kittery to Eastport – are one of the state's greatest assets and resources, greater in acreage and economic importance than our public lands ashore. These waters are part of one of the most productive ecosystems in the world and are home to a tremendous diversity of marine organisms. Tourists seek the coast to enjoy the view, water sports, fishing and an amble near the shore. Shipbuilding, fishing, recreational boating and other activities along the coast are a major source of employment for Maine residents. More than half of the state's population live and work along the coast. Despite the importance of these resources, Maine does not have a comprehensive policy framework for managing this inestimable resource.

Maine does regulate various aspects of this near-shore environment. Over 18 federal and state agencies and all of Maine's 144 coastal municipalities have some responsibility for managing coastal resources. Most of these regulations were designed to address specific problems and have resulted in complex, confusing, overlapping and at times gaping management regimes. For example, an activity in a coastal wetland requires a federal, state and local permit. Permitting has become the primary focus of Maine's management of coastal resource, management that should focus on economic development, ecological research, monitoring and evaluation. This hinders economic opportunities as well as overlooks the interdependence of parts of the ecosystem and the people who depend on it.

Ecosystem management can offer a framework for managing our marine resources as we approach the next millennium. Through an ecosystem management approach, Maine can more efficiently use its resources, identify priorities and build a system that includes long-term research, data collection, monitoring, regulation and evaluation.

I. Why Ecosystem Management?

Most of our current regulations were enacted in the 1970s in response to major identifiable strains on our natural resources. At the federal level, the Clean Air Act, the Clean Water Act, the National Environmental Protection Act, and the Endangered Species Act were enacted by Congress to respond to major threats to our natural resources. In Maine, the Site Location of Development Act was enacted to address the impacts of large developments, as well as laws protecting coastal wetlands, rivers, streams and lakes. Industry was the major contributor to our fouled air and water, exacerbated by unmanaged development. Implementing these laws solved major environmental problems.

However, in the 1990s, the environmental problems we face are more complex and difficult to address. As discharges and major development come under control, more complex and interrelated stresses threaten our natural resources. While major successes have been accomplished, the job is not complete and growth continues. Water pollution is an example: In

the 1970s, industrial discharges and untreated sewage were polluting most of our rivers. Today, the biggest problem is non-point source pollution, small levels of pollutants from a variety of sources – individual septic systems, and runoff from urban areas, farms and logging operations. These are serious threats and much harder to manage because they are dispersed.

Many of our laws and regulations are still effective in mitigating pollution. The problem is that we are operating under a regulatory framework that has been enacted over the last twenty years without the benefit of an overall policy or vision. There are gaps and redundancies in this framework, while at the same time it is complex and confusing. The symptoms of the lack of a comprehensive policy for the marine environment are numerous:

- * State agencies and municipalities do not consider the ecosystem as a whole when permitting activities. Decisions impacting a particular resource are made on a case-by-case basis usually concentrating only on one medium, with little consideration given to the overall system.
- * There are few links between the upland activities and marine resources. Protection of special areas under the Mandatory Shoreland Zoning Laws (38 MRSA §435), Site Location of Development Laws (38 MRSA §481) and the Municipal Subdivisions Laws (30-A MRSA §4401) do not consider marine resources such as shellfish beds or marine nursery areas.
- * Municipalities are not looking at regional issues through their comprehensive plans even though required to do so under the Growth Management Act (30-A MRSA §4311). There isn't a forum for neighboring municipalities or other stakeholders to comment on development proposals or to develop shared goals for a particular resource even though it may have significant economic value.
- * Habitat areas for commercial fish species or marine organisms are not protected. We regulate the timing and sometimes location of species harvest but do little to protect the habitats that sustain these species.
- * No mechanism exists for evaluating the overall effectiveness of our regulations. Evaluations are done sporadically and often focus on individual regulations. A systematic approach would examine the interrelationships among the various regulatory strategies.
- * Our regulatory system offers little flexibility for local concerns or issues. Southern Maine, with its extensive salt marshes, relatively straight shoreline and sandy beaches, is treated in the same way as down east Maine with its rocky shores and extreme tides. Setbacks and other management tools are applied uniformly though the natural systems are not uniform.

The piecemeal regulation of our marine resources in response to escalating environmental threats results in a complex system of environmental laws that are difficult to understand and to comply with, and are strictly regulatory in approach. The cost-effectiveness of dealing with

various problems is not addressed. The result is a management scheme that is least effective for the ecosystem in the long-term and does not reflect the state's priorities.

Ecosystem management is offered as an approach to holistically manage our marine resources, taking into consideration the ecosystem as a whole and the people who depend on it. Ecosystem management offers a focus positively on maintaining important resources at a meaningful level of supply and quality. In concept, it offers a more cost-effective and focused approach to managing natural resources and development.

II. What is Ecosystem Management?

Ecosystem management is an approach to management that considers the interrelatedness of resources, is based on sound science, and considers humans as part of the system. The goal is to improve management of our marine resources that human needs and the environment are integrated to the best of our ability over the long-term. Such an approach requires coordination at all levels of government, clear management objectives that are routinely evaluated and a scope of management that considers the natural system rather than political boundaries.

In a practical sense ecosystem management strives to maintain the integrity of the basic ecological unit. Piecemeal management – ignoring the interdependence of various parts of an ecosystem – can lead to environmental and biological decline. Ecosystem management recognizes that the environment is comprised of many interconnected systems and subsystems. Land, water, air and living things are all linked and cannot be managed in isolation from one another.

Ecosystem management differs from Maine's current approach for managing natural resources in that it is cross-disciplinary and requires managers to think through the implications of their decisions not just on adjacent resources but on resources beyond the scope of the permitted activity: downstream, between the land and water interface, and in other watersheds. Figure 1 outlines basic concepts and principles that characterize ecosystem management (Grumbine, 1994).

Figure 1.

Properties of Ecosystem Management

1. Hierarchical Context or Connectedness

A focus on any one level of natural systems is not sufficient. When working on a problem at a particular level or scale, managers must seek the connections between all levels. This is often described as a "systems" perspective.

2. Ecological Boundaries or Management

Management requires working across administrative or political boundaries and large landscapes to incorporate the entire ecosystem. Estuaries and watersheds would be managed as complete systems, addressing both land-use and water resource issues.

3. Ecological Integrity

Management must protect, maintain, and restore native diversity, ecological patterns and the processes that maintain diversity.

4. Data Collection

Ecosystem management requires research and monitoring of baseline conditions of natural systems as well as better management and use of existing data.

5. Monitoring or Evaluation

Managers must track the results of their actions so their success or failure may be evaluated quantitatively. There needs to be an on-going feedback loop of useful information.

6. Adaptive Management

The development of scientific knowledge must be seen as ongoing and management as a learning process where incorporating the results of previous actions allows managers to remain flexible and adapt to uncertainty.

7. Interagency Cooperation

Protecting and managing systems requires cooperation between federal, state and local management and regulatory agencies as well as private parties. Managers must learn to work together and integrate conflicting legal mandates and management goals.

8. Organizational Change

Implementing ecosystem management requires changes in the structure of agencies and the way they operate to broaden the scope of management.

9. Humans Embedded in Nature

People cannot be separated from nature. Humans are fundamental influences on ecological patterns and processes and are in turn affected by them.

10. Values

Regardless of the role of scientific knowledge, human values play a dominant role in ecosystem management goals.

The strengths of ecosystem management are that its principles are grounded in science and an understanding of natural systems. It offers a more natural approach to resource management and strives to maintain ecological integrity and biodiversity. Because it is based on how ecosystems work, ecosystem management offers opportunities for flexibility in regional management schemes. For example, development setbacks may not be important for resource protection in some areas as they are for others. Finally, ecosystem management acknowledges that people are part of the ecosystem and realistically integrates their needs and impacts on the system as a whole.

The weaknesses of ecosystem management are that while this concept has been around for some time and understood by scientists and land managers, it is not clear how to implement this approach on a statewide level. Managers and regulators are breaking new ground in trying to administer and implement these concepts. Ecosystem management requires institutional change and training to implement because it is cross-disciplinary in approach. Working across political jurisdictions also can be difficult and frustrating. Finally, ecosystem management is grounded in science, but we will never know enough to manage by scientific facts alone. Thus, we need to make reasoned choices about our environment without all the information that is needed. These choices are not devoid of value judgments.

III. The Need for Ecosystem Management

Maine's marine environment needs to be managed from an ecosystem perspective. This section outlines four reasons why marine resource management needs to be rethought.

1. Regulatory Systems Need to Be Reworked

There are two examples of regulatory systems in Maine that need a closer look: water classification and the lobster fishery.

Marine waters in Maine are broken into three categories according to their quality (SA, SB, SC). Allowable standards for discharges are based on these categories with certain discharges and activities prohibited in the cleaner categories. Class SA waters are considered outstanding natural resources to be preserved because of their ecological, social, scenic, economic or recreational importance. Direct discharges to SA waters are prohibited. Acadia National Park and several coastal state parks have adjacent waters classified SA. Parts of Cobscook Bay are classified SA for ecological reasons, as well as the coast from Cutler to Lubec and areas around the Isle of Shoals.

While no discharges are allowed in SA waters, other activities that may affect their ecological integrity are unregulated. For example, draggers can comb the bottom at will and destroy the environmentally sensitive habitat this classification is designed to preserve. A marina can be sited within sensitive SA waters, with the potential for petroleum spills from fueling and sewage from boats. On the other hand, net pen aquaculture, so dependent on clean water and high flushing rates, cannot be sited in SA areas because fish feed and medicines are considered a discharge.

This regulatory system developed in the 1970s is perpetuated as our basis for managing water quality. Yet it is a single-purpose approach that regulates one activity without a comprehensive approach for managing other threats to, or opportunities for, these same resources.

The other example of regulatory systems that need a fresh approach is the lobster fishery. Maine is renowned for its lobster fishery and it brings in \$75 million per year. Harvesters are regulated over how and when they catch lobsters but the population levels and essential habitats are not protected. Indeed, surprisingly little is known about the habitat requirements for sustaining this important species.

2. Municipal Concerns for Shared Resources

Boothbay recently approved an application for an expanded marina along the Damariscotta River. During the application stage, towns along the River expressed concern over the impact the increased numbers of boats would have on the pristine waters of the Damariscotta River that host a thriving aquaculture industry. Concerns were also raised about increased boat traffic and other potential use conflicts. While this proposal has the potential to significantly affect a resource shared by several towns, there is no forum for these concerns to be considered or a common vision of how this resource should best be used. This example highlights how limited our approach is for resources that have not only ecological but economic value cross town boundaries.

3. Cumulative Impacts

The Department of Environmental Protection regulates large scale land-use developments and development within particularly sensitive habitats such as coastal wetlands and sand dunes. Their review is restricted to site-specific standards that do not allow a broader view or consideration of threshold impacts. For example, the first structure within a sensitive environment may not have an unreasonable impact on the ecological integrity of that area, however the third, fourth or eighth structure will. There is no way to address this under the current regulatory scheme.

Many land-uses that could potentially affect the marine environment do not trigger an environmental review. Small land use development and non-point sources, whose cumulative effects can drastically alter the marine environment, are examples of these impacts. Effects on marine resources are not often included in land use reviews because decision-makers don't have the tools, expertise or regulatory authority to consider those effects.

4. Poor Linkages Between Science and Policy

Maine does not have the resources to address major management issues in our fisheries, or the tracking systems to evaluate the policies that are in effect. Budgetary problems have forced state agencies, including the Maine Department of Marine Resources, to streamline research staff. Much of current marine research is funded through surcharges on specific harvesting licenses, limiting the breadth and scope of work that can be done. Little money is

allocated to monitoring marine conditions; an important element of understanding threats to the system. And little is available to fund basic research by community of marine scientists at public and private academic institutions in the State. As a result, the foundation of basic knowledge isn't growing as it should, and communication between scientists and managers is weak.

For example, Maine has hosted a burgeoning sea urchin roe fishery in the past several years. Landings have skyrocketed to 42 million pounds (with a value of \$27 million) in just 5 years. While the fishing industry has enjoyed the opportunities this new fishery represents, it's not clear what effect this sudden, intense harvesting pressure has on the marine ecosystem as a whole and what harvesting levels are sustainable. Harvesting is regulated by size of urchin and by season. Meanwhile, research funds to address these questions are limited.

In summary, these examples demonstrate how we are not integrating our regulation or management of natural resources in a coherent system. We are using single-purpose regulatory schemes to manage multi-faceted resources; we don't coordinate local decisions even though they have the potential to affect economically valuable resources; we don't have an understanding of the threshold of change our ecosystems can tolerate; and we don't invest in the science or monitoring needed to understand the ramifications of our current actions on the ecosystem. In short, our coastal ecosystems deserve a better management system.

V. Examples of Ecosystem Management

The concept of ecosystem management has captured the attention of federal agencies, landholding organizations and state governments and has been applied in many different contexts. This section outlines several examples of how it has been used in other regions. While these examples provide a diverse range of approaches, their underlying theme is a more holistic view of natural resource management. Maine has used the principles of ecosystem management in a recent project and this example is outlined last.

1. Federal Level: EPA Place-Based Management

The US Environmental Protection Agency (EPA) is trying to move beyond their regulatory mode and focus on place-based environmental management tied to key problems that occur in particular ecosystems. It relies on stakeholders in those places to define the problems, set the priorities, and help with the solutions. EPA will be developing a process in the coming year to focus on the environmental problems of specific places rather than following their traditional single-media approach. For any given place EPA will evaluate long-term ecological, economic and social needs and reorient their work to meet those needs. EPA also will coordinate in-house programs and collaborate with external partners to define roles and responsibilities at each place. The "Edgewater Consensus" as this initiative is known, is in its formative stage. Each branch of the agency has been directed to develop work plans for implementing this approach.

The US Forest Service also is integrating ecosystem management into their management regime by looking beyond their ownership boundaries to determine the significance of their

lands in a larger context for meeting societal and environmental needs. The Department of Interior has created the National Biological Survey, consolidating research in one agency to stimulate cross-disciplinary research that is not tied to the mandate of one agency.

2. State Level: Florida

The State of Florida is developing a proposal to move the State toward ecosystem management. The Florida Environmental Reorganization Act requires the State to "Protect the functions of entire ecological systems through enhanced coordination of public land acquisition, regulatory, and planning programs." Their concept is based on an environmental strategy that encourages innovation, pollution prevention, incentive-based regulatory alternatives, and more coherent cross-media efforts to produce collaborative solutions to environmental problems.

The Department of Environmental Protection (DEP) has defined ecosystem management¹, articulated goals², developed a work plan to move toward those goals, and worked with committees to develop recommendations on what ecosystem management will entail. These committees, covering 12 distinct areas from pollution prevention to the role of private landowners, have made their recommendations. DEP is integrating their work to develop an implementation strategy. A report is expected in late Spring 1995.

3. Landholding Organizations: Virginia Coast Reserve

The Virginia Coast Reserve is a string of barrier islands more than 100 miles in length that fronts Virginia's shoreline. These islands, owned by The Nature Conservancy (TNC) and State and Federal Government, are the last undeveloped, fully-functioning barrier island ecosystem on the unglaciated coast, considered the most significant natural ecosystem in the Eastern United States.

Long-term protection of this system requires more than simple ownership and they are now managed as part of a larger system that is bound not only by biological ties but economic and cultural ones as well. These islands were designated a biosphere reserve in 1979, that consists of a core area that receives maximum protection (the actual islands), a buffer zone that is managed to protect the core (adjacent mainland watersheds), and a transition zone or "zone of cooperation" that includes farms, village clusters, businesses, recreational facilities and compatible industry.

¹ Florida defines ecosystem management as an integrated, flexible approach to management of Florida's biological and physical environments – conducted through the use of tools such as planning, land acquisition, environmental education, regulation, and pollution prevention – designed to maintain, protect and improve the state's natural, managed, and human communities (Beginning Ecosystem Management: an action plan for development of an ecosystem management implementation strategy, Florida Department of Environmental Protection, 4/25/94).

² Florida's three goals are: better protection and management of Florida's ecosystems, agency structure and culture based on a systems approach to environmental protection and management, and an ethic within the citizenry of shared responsibility and participation in protection of the environment (IBID).

High density housing developments are the greatest threat to the Virginia Coast Reserve as the cumulative effects of these developments have the potential to degrade the bay and marsh ecosystem. TNC has been working with private landowners to enact conservation easements and with local government to design zoning ordinances to balance conservation and development. They also have bought strategic sites, placed easements on them and resold them on the open market, ensuring that the land use is compatible with the reserve system. (Badger, 1990)

4. Local Level: Damariscotta River Estuary Project

In 1993, the Maine Coastal Program initiated the Damariscotta River Estuary Project (DREP). The goal of the project is to develop an estuarine management plan that will be supported and implemented by the seven towns in the watershed. A steering committee of 17 local citizens, including one member from each local land trust, the Damariscotta River Association, and the Lincoln County Planning Office, has guided the activities of the project from its inception. Resource information has been provided on GIS computer-generated maps to display interrelationships within the watershed and help focus the group.

The project is looking at the estuary as an ecosystem to understand the link between upland and marine resources. DREP has characterized the upland and marine resources on a systems basis, focusing on the relationships among resources. The project has also conducted an economic valuation of the local economy, which is largely dependent of shellfish harvesting and shellfish aquaculture.

The staff is now developing a estuarine management strategy for the area. Each town has a comprehensive plan but management of the estuary on a system basis requires coordination between the plans. The success of the strategy depends on interlocal implementation. The staff is working closely with local planning boards and citizens to design a system that will work for these rural communities. The project expects to complete the strategy by the summer of 1995.

As these four diverse examples show, there is no one approach for using ecosystem management; each agency needs to define their approach to meet their objectives. The underlying characteristics as outlined in figure 1 are what make it ecosystem management.

VI. Moving Forward: The First Steps

Changing our regulatory framework for managing near shore resources is a large undertaking. There are some basic steps Maine can take to embark on this endeavor.

1. Land and Water Resources Council: Leading the Way

The Land and Water Resources Council (LWRC) should review the concept of ecosystem management as an opportunity to better manage and regulate Maine's resources. This paper focuses on coastal ecosystems but the approach makes sense for inland Maine as well. The LWRC, comprised of Commissioners whose agencies manage natural resources, is in the unique position to move ecosystem management forward. Ecosystem management can offer

cross-agency efficiency in research and management. It can serve as a framework for Maine to articulate land acquisition, management, and economic development goals.

The Maine Environmental Priorities Project (MEPP) will rank environmental risks within the year, balancing human health and environmental risks with quality of life concerns. The LWRC should use this information to focus ecosystem management on what natural resources are most at risk and of most concern to Maine's people.

- A. The LWRC should look in-depth at the opportunities for ecosystem management. A model that incorporates extensive public involvement (similar to the State of Florida) should be used.
- B. In conjunction with A above, should develop a mechanism to coordinate research and monitoring in a way that crosses agency lines, and offers some efficiencies. The Department of Interior's recent formation of the National Biological Survey, which consolidated the Department's research into one agency, is one model that could be explored.

2. Create Interagency Teams to Integrate Permitting

Currently, applicants must receive 3 to 5 permits for activities occurring in the near shore environment. While most applicants understand the need for multiple reviews, the process of compiling multiple applications is lengthy, complicated and expensive. An integrated permit would streamline the permitting process and enhance coordination among different levels of government.

- A. The LWRC should evaluate interagency permitting teams to integrate and expedite interagency review of permits, building on DEP's watershed division. Team permitting would allow the reviewers to work from the same application, share information about resources within their areas of expertise, and identify the most effective way for an activity to proceed. Teams would integrate different media and resources. Team members would be empowered to make permitting decisions on behalf of their agencies, ensuring that high caliber agency personnel would be assigned to these teams. These teams also could incorporate local input to expedite the process at the local level.
- B. In addition, the LWRC should evaluate mechanisms to work with federal and state permitting systems to integrate both application and review procedures and standards.

3. Consolidate and Coordinate Local Technical Assistance

A network of federal, state and regional entities provide technical information to local boards and authorities. From a local perspective, the array of assistance providers can be complex and confusing. Consolidation and coordination of these functions would better serve the constituent.

- A. The State Planning Office should develop a framework to coordinate these functions through a handbook or hotline.

4. Integrate Data Management Systems

The challenge of this decade is to bring information together across projects, environmental media (land, air, water), programs and political boundaries. Appropriate data, gathered either through routine monitoring or focused research, analyzed and distilled into user-friendly formats, is critical for making good management decisions.

Maine needs to further their work on integrating data management systems to provide this framework for decision-making. Data also needs to be available on a regional basis, including permitting sites. Interactive systems that can provide and receive information from local agencies should be developed to ensure that decisions reflect current information.

- A. A regional pilot project as described below provides an opportunity tool to develop a template for the type of information that is needed and can be used when trying to manage our resources on an ecosystem basis. Any work on a pilot project for ecosystem management needs to incorporate a data management piece. This work can build on GIS work done through the Casco Bay Estuary Project and the Damariscotta River Estuary Project.

5. Pilot Project

Implementing ecosystem management requires both state and local actions. The state needs to set overall guidelines and policies, provide examples and assistance, and develop an overall structure for implementation. Towns need to come together to manage shared resources and work toward common goals, opportunities, and management regimes. The most effective tool for accomplishing this is through a regional plan focused on ecosystem boundaries. This plan, referred to here as a Coastal Ecosystem Strategy, would provide the forum for gathering information and making consistent policy decisions across town boundaries. Below is the outline of a planning tool that can lay the framework to accomplish this work. Additional roles for state government and municipalities are included in Appendix A.

The forum for developing ecosystem management of our marine resources would be a Coastal Ecosystem Strategy, to integrate municipal and state activities and decisions. A Coastal Ecosystem Strategy would be based on a scientific understanding of the function and importance of the marine ecosystem and recommend measures to protect these functions. Since each plan would be based on the regional ecology, the management system would be tailored to the needs and uniqueness of the region and would build on the information and policy decisions reflected in the local comprehensive plans. Briefly defined, a Coastal Ecosystem Strategy would:

- * Define goals to balance protection, economic opportunities, recreational activity and infrastructure needs;
- * Characterize the ecosystem's ability to support these goals in terms of commercial resources, recreational facilities, and ecological resources;

- * Define management tools to achieve desired goals such as marine growth areas, marine conservation areas, marine-use zones, upland setbacks, and permitting and review coordination;
- * Identify marine conservation areas and management recommendations that meet state-generated guidelines;
- * Define region-specific public access, research and education needs;
- * Define a monitoring program to test management measures; and
- * Develop a periodic review process to refine the goals of the plan and the effectiveness of the various tools used.

Coastal Ecosystem Strategies offer a strong foundation for improving management of our near-shore marine resources. It provides a tool to define areas where growth should or should not go. It can be used to balance economic opportunities for our marine resources while ensuring their viability.

- A. Building on the experience of the Casco Bay Estuary Project, the Damariscotta River Estuary Project, and EPA's place-based strategies, the LWRC should develop a pilot ecosystem management project in a coastal watershed, using the model of a coastal ecosystem strategy defined above.

VIII. Summary

Ecosystem management offers a way to build a new method to manage our near shore resources. Specifically, ecosystem management would:

- * Be based on sound science;
- * Adapts to new information;
- * Balance protection and development;
- * Measure effectiveness and readjust accordingly;
- * Coordinate within and across government to design an integrated program for a particular ecosystem;
- * Build on local planning efforts and be responsive to the needs of a given particular area; and
- * Actively involve all individuals and groups with an interest in the area.

Maine's coastal economy is one of the most important and productive sectors of state's economy. Aquaculture, which depends on clean water, is one of Maine's primary growth industries. Tourism is the second largest sector of Maine's economy. As budgets become tighter, Maine will be forced to make natural resource management priorities. Ecosystem management offers an approach for effectively managing the resources on which these activities depend.

Developing ecosystem management strategies requires a commitment of time and resources. However, this should translate into more efficient use of our state monies, faster permitting and more effective regulation of the resources on which we depend.

Appendix A: State and Local Roles in Coastal Ecosystem Strategies

A. State Role

The State of Maine should take the lead in defining what a system of regional plans, or Coastal Ecosystem Strategies, would look like and offering support through technical assistance and information. Specifically, the State would:

- * Identify natural ecosystems and their boundaries. This would entail dividing the coast into discrete ecosystem units;
- * Develop guidelines for plans that provide a template for how to develop and integrate the needed information. This also would include an outline and model plans;
- * Suggest consistent land use and water quality standards for municipalities to adopt to manage their resources, such as setbacks and erosion and sedimentation control;
- * Identify important marine resources to protect and manage and suggest tools to manage these resources. Actual management would occur at the state and local level;
- * Provide technical assistance to groups of municipalities developing Marine Ecosystem Plans;
- * Define criteria for and suggest candidate sites for marine conservation areas; and
- * Provide financial incentives for completing plans and local permitting options for municipalities that undertake this approach.

B. Municipal Role

Municipalities working together play the central role in developing Coastal Ecosystem Strategies. As a group, municipalities' role in developing these plans would be to:

- * Identify issues of shared concern;
- * Define local goals and priorities for shared management based on ecological and economic characterizations of the ecosystem;
- * Develop plans and a framework for regional management that will meet state and local goals;
- * Integrate local knowledge and concerns into these plans;
- * Adopt consistent land use standards and management requirements; and
- * Implement the plans through regulating land and water uses.

Most coastal and marine ecosystems extend beyond municipal boundaries and any attempt to consistently manage these ecosystems must rely on regional cooperation. Municipalities acting alone are unable to protect coastal ecosystems from impacts upstream or outside their boundaries. Besides ecological concerns, towns working together can enhance their own economic goals and public access opportunities. This model offers a mechanism for doing this.